

Claims

1. A folding apparatus (28) with at least one first cylinder (01, 32), a second cylinder (14) embodied as a folding jaw cylinder (14), and a cutter cylinder (04), by means of which product sections (08) of a defined length (L) can be cut from a continuous web (07),

- wherein the first cylinder (01, 32) and the second cylinder (14) are seated in a common frame (29),

- wherein the folding apparatus (28) is embodied to provide a seating arrangement of the cylinders (01, 32, 14) in the frame (29), a drive geometry and a relative position between the first cylinder (01, 32) and the second cylinder (14) in which, while maintaining this seating arrangement, the drive geometry and the relative position between the first cylinder and second cylinders (01, 32, 14), the folding apparatus (28) can be selectively equipped with a first cylinder (01, 32) embodied as a gripper cylinder (01) or as a spur needle cylinder (32) in such a way that product sections (08) of the same length (L) can be processed,

- wherein the circumferential speed of the first cylinder (01) exactly corresponds to the feeding speed of the continuous web (07).

2. A folding apparatus (28) with at least one first cylinder (01, 32), a second cylinder (14) embodied as a folding jaw cylinder (14), and a cutter cylinder (04), by means of which product sections (08) of a defined length (L) can be cut from a continuous web (07),

- wherein the first cylinder (01, 32) and the second

cylinder (14) are seated in a common frame (29),

- wherein in a first embodiment a first such folding apparatus (28) is embodied to have a first cylinder (01, 32) designed as a spur needle cylinder (32) and has a first seating arrangement for the first and second cylinders (32, 14) in the frame (29), a first drive geometry for at least the first and second cylinders (32, 14), and a first relative position between the first cylinder (32) and second cylinder (14), characterized in that

in a second embodiment a second such folding apparatus (28) is embodied with a first cylinder (01) designed as a gripper cylinder (01), wherein in the second embodiment product sections (08) of the same length (L) as in the first embodiment can be processed,

and that the seating arrangement of the second embodiment, the drive geometry and the relative position between the first cylinder (01) and the second cylinder (14) of the second embodiment correspond to the seating arrangement, drive geometry and relative position of the first embodiment.

3. The folding apparatus in accordance with claim 2, characterized in that, for the embodiment of the spur needle cylinder (32), as well as the embodiment as gripper cylinder (01), the circumferential speed of the first cylinder (01, 32) exactly corresponds to the feeding speed of the continuous web (07).

4. The folding apparatus in accordance with claim 1 or 2, characterized in that, for the embodiment of the spur needle cylinder (32), as well as the embodiment as gripper cylinder (01), the circumference of the first cylinder (01, 32) corresponds to a

whole number multiple of the length (L) of the product sections (08) to be processed.

5. The folding apparatus in accordance with claim 1 or 2, characterized in that in the case of the first cylinder (01, 32) being designed as a gripper cylinder (01), the grippers (02) are embodied for performing a translatory movement in addition to the pivoting movement.

6. The folding apparatus in accordance with claim 1 or 2, characterized in that two product sections (08), which are arranged one behind the other in the circumferential direction on the first cylinder (01) embodied as a gripper cylinder (01), are arranged without being spaced apart on the circumference of the first cylinder (32).

7. The folding apparatus in accordance with claim 1 or 2, characterized in that two product sections (08), which are arranged one behind the other in the circumferential direction on the first cylinder (32) embodied as a spur needle cylinder (32), are arranged without being spaced apart on the circumference of the first cylinder (32).

8. The folding apparatus in accordance with claim 1 or 2, characterized in that the gripper cylinder (01), the spur needle cylinder (32) and the folding jaw cylinder (14) have the same exterior circumference.

9. The folding apparatus in accordance with claim 1 or 2, characterized in that the transmission ratio between the first

cylinder (01, 32) and the second cylinder (14) is the same for the embodiment of the first cylinder (01) as a gripper cylinder (01), as well as the embodiment of the first cylinder (32) as a spur needle cylinder (32).

10. The folding apparatus in accordance with claim 1 or 2, characterized in that a distance (a) between the axes of rotation (R01, R32, R14) of the first and the second cylinders (01, 32, 14) is the same for the embodiment of the first cylinder (01) as a gripper cylinder (01), as well as the embodiment of the first cylinder (32) as a spur needle cylinder (32).

11. The folding apparatus in accordance with claim 1 or 2, characterized in that a relative position between the first, second and cutter cylinders (01, 32, 14, 04) is the same for the embodiment of the first cylinder (01) as a gripper cylinder (01), as well as the embodiment of the first cylinder (32) as a spur needle cylinder (32).

12. The folding apparatus in accordance with claim 1 or 2, characterized in that in both embodiments a frame (29) with identical bores is provided for receiving bearings for both cylinders (01, 32, 14).

13. The folding apparatus in accordance with claim 1 or 2, characterized in that the same relative position of a drive motor (31) in respect to the first cylinder (01, 32) is provided for both embodiments.

14. The folding apparatus in accordance with claim 1 or 2, characterized in that a frame (29) supporting the cylinders (01, 32, 14) has a recess for exchanging the first cylinder (01, 32).

15. The folding apparatus in accordance with claim 1 or 2, characterized by two groups, each with at least a first cylinder (01, 32), a second cylinder (14), as well as a cutter cylinder (04), wherein at least one of the first cylinders (01, 32) is designed in one embodiment as a gripper cylinder (01), and in another embodiment as a spur needle cylinder (32).

16. The folding apparatus in accordance with claim 1 or 2, characterized in that the one cylinder (01) designed as a gripper cylinder (01) has a cylinder body and at least one gripper (02), which can be moved between a position in which it is retracted into the interior of the cylinder body, an extended position and a clamping position, wherein in the clamping position a tip of the gripper (02) presses a flat material (07, 08) from the outside against a surface section (26) of the cylinder body.

17. The folding apparatus in accordance with claim 16, characterized in that the gripper cylinder (01) has a first shaft (27), around which the gripper (02) performs a pivot movement between the retracted and the extended position, and that the first shaft (27) is movable in the radial direction of the cylinder body.

18. The folding apparatus in accordance with claim 17, characterized in that the pivot movement of the gripper (02) and the radial movement of the first shaft (27) are coupled in such a

way that the first shaft (27) moves radially inward in an end phase of the pivot movement into the clamping position.

19. The folding apparatus in accordance with claim 17 or 18, characterized in that the first shaft (27) is supported by a first arm (19), which is pivotable around a second shaft (21), which is fixed in place in respect to the cylinder body, in order to drive the radial inward movement of the first shaft (27).

20. The folding apparatus in accordance with claim 19, characterized in that a pivot movement of the first arm (19) is driven with the aid of a cam disk.

21. The folding apparatus in accordance with one of claims 16 to 20, characterized in that at one end a coupling rod (22) is hinged on the gripper (02) and at the other end on a second arm (23), which is pivotable around a third shaft (24), in order to drive the pivot movement of the gripper (02).

22. The folding apparatus in accordance with claim 21, characterized in that a pivot movement of the second arm (23) is driven with the aid of a cam disk.

23. The folding apparatus in accordance with claim 19 or 20 and claim 21 or 22, characterized in that of the two arms (18, 23) the first arm (18) is oriented more in the circumferential direction, and the second arm (23) more in the radial direction of the cylinder body.

24. The folding apparatus in accordance with claim 1 or 2, characterized in that the first cylinder (01) is designed as a folding blade cylinder (01).

25. The folding apparatus in accordance with claim 1 or 2, characterized in that, for the translatory movement of the gripper, the shaft of the gripper as such is seated to be movable in the radial direction.